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CONTENTS

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SUGGESTIONS FOR PHYSICAL INVESTIGATIONS BEARING UPON FUNDAMENTAL PROBLEMS OF PHYSIOLOGY AND MEDICINE[1]

SINCE diseased conditions imply deranged cell-processes—leading to failure of local functioning or to defective coordination between the activities of different parts of the organism—it is clear that the problem of preventing and rectifying such derangements in man (the problem of medicine) resolves itself ultimately into the means by which cell-processes can be restored to the normal after disturbance. A scientific (as distinguished from an empirical) knowledge of how to restore normal conditions must be based on an exact knowledge of the conditions determining normal protoplasmic activity, and this knowledge presupposes a fuller insight into the fundamental physico-chemical constitution of protoplasm, since it is only through an understanding of the properties of the essential living substance that we can hope to understand how the living system acts under different conditions.

The fundamental questions are thus: what kind of a system, in the physico-chemical sense, is living protoplasm? and what are the conditions of equilibrium, *i. e.*, of normal self-maintenance, of such a system?

As a physico-chemical system protoplasm is peculiar in various respects, of which perhaps the chief are:

1. The self-maintenance of the system through its own continued chemical activity; *i. e.*, the preservation of the normal equilibrium—or continued life—depends upon the active continuance of the chemical processes

[1] Contribution to the discussion at the Conference on Biophysics held by the National Research Council, Division of Medical Sciences, at Washington, February 21, 1920.